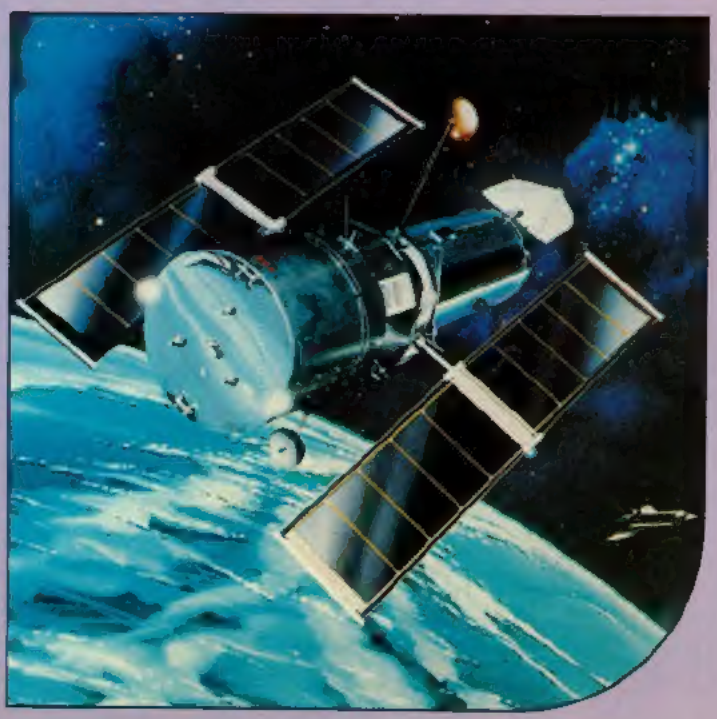
cience Magazine from CTW, the Creators of Sesame Street. February 1983

3-2-1 CONTACT™

Inside: White Tigers Make Zoo News



What's Up?

Saturn and its moons are way up. In fact, they're so far from Earth that it took the spaceship *Voyager 1* more than three years to reach them. When *Voyager* finally got there, it sent back great pictures. People had never before seen Saturn so clearly. Four of those shots were put together to get the picture you see here.

You can check out some other neat space shots and find out how much you know about the solar system. For instance, do you know how many rings Saturn has? To take a guess about that and other questions, turn to the quiz on page 14.

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Featuring This Month

Plus Our Regular Departments

This white tiger and its cub are part of the Cincinnati Zoo's special collection of rare white tigers.

White Tigers

by John Fay

A RARE CAT MAKES ZOO NEWS

The large tiger rests his paws on a tree stump and relaxes in the sunshine. Light gleams on his unusual pale fur. This big cat is different from any other tiger you've ever seen. His coat is white as snow. His stripes are chocolate brown. And his eyes are icy blue.

Even though he looks different, he acts much like other tigers. Suddenly, he springs to his feet and charges toward another large white cat. Meeting with forepaws raised, they tumble to the ground. They roar and growl. It all seems frightening. But the two tigers are playing, just like a couple of overgrown house cats.

There are only a few places in the world where you can watch two 400-pound (180-kg) white tigers wrestle. One is the Cincinnati Zoo, where 12 of these rare tigers make their home. If you visit the zoo, the place to see them is their Cat Canyon playground. There, a protected walkway will give you a chance to observe the tigers at close range.

Because they are so unusual, white tigers are popular with kids and adults who visit zoos. That's why Ed Maruska, director of the Cincinnati Zoo, was eager to bring these rare animals here. But getting even one white tiger wasn't easy.

To start with, all tigers are very rare. White ones are even more so. There are less than 5,000 tigers in the whole world and only about 50 white tigers. In the wild, hunters often killed white tigers to get their skins as trophies. Luckily, however, one white tiger named Mohan met a different fate. Mohan, a young male, was captured in the jungle of India about 30 years ago. He was used to start breeding more white tigers. All the white tigers now living

Here, a tiger is well-hidden against a snowy background. But in the jungles of India where white tigers lived, they were easy to see. Many hunters were able to shoot them.

in zoos today are his descendants.

The Washington Tigers

One of Mohan's daughters, Mohini, later came to live at the National Zoo in Washington, D.C. "I first saw Mohini at a zoo convention in the 1960s," says Ed. He thought she was terrific. So he began to look for a white tiger for Cincinnati.

Soon Ed learned that an English zoo had two white tigers. He traveled to England, hoping to buy one of the cubs. He even took along a check for $50,000 from a wealthy person who wanted to help bring one of these tigers to Cincinnati. But the plan didn't work. The white tiger the English zoo was willing to sell was not strong and healthy. Ed decided it was better to come home without that tiger and keep looking.

Although he hadn't managed to buy a white tiger, Ed soon had a chance to raise them at his zoo. The National Zoo in Washington was rebuilding its tiger exhibit. While the work was being done, they sent a couple of tigers to the Cincinnati Zoo for safekeeping.

The tigers were named Kesari and Ramana. They looked like regular orange tigers, but could trace their ancestry back to Mohini. This meant ➤➤

Left: This tiger is like other tigers except that its fur is white and its eyes are blue.

that they carried genes for white tigers. If these two orange cats mated, there was a chance that some of the cubs would be white tigers. (You can see how this works by checking the chart on page eight.)

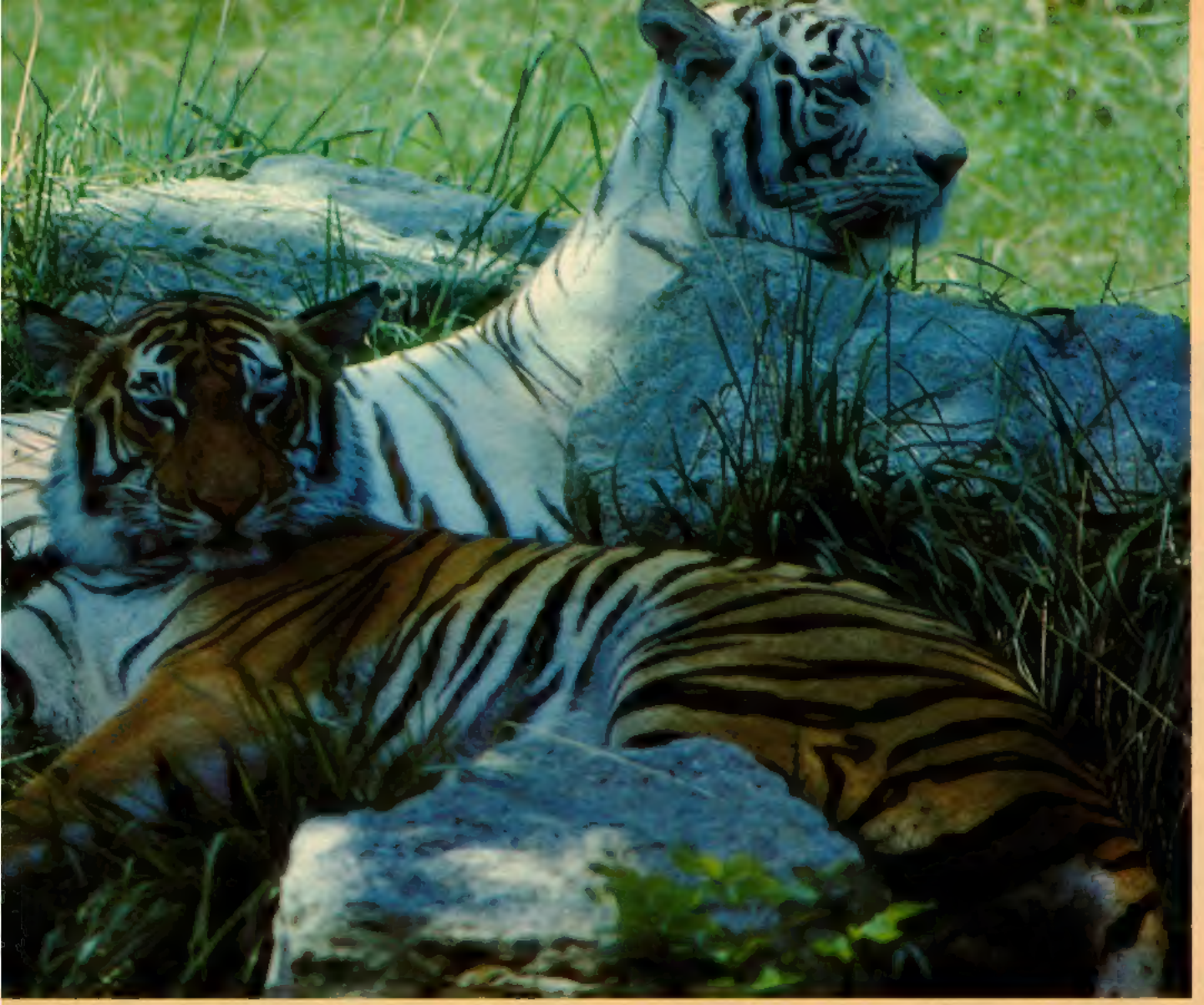
Kesari and Ramana produced three white cubs in Cincinnati. Unfortunately, all these cubs belonged to the National Zoo. But then Ed made a deal that Kesari could stay on for a breeding loan. The National Zoo agreed that Cincinnati could keep some of her cubs. All Ed had to do was find her a male white tiger as a mate. It wasn't easy, but he found one named Tony who was traveling with a circus.

"We had very little time," Ed said. "The circus was

Right: Here is one of the 22 white tigers born at the Cincinnati Zoo. There are only about 50 white tigers in the whole world.

When white tigers are babies, even their stripes are pale. But the stripes turn chocolate brown as they grow older.

Above: If you go to the Cincinnati Zoo, you can see orange tigers and white tigers living together in Cat Canyon. A protected walkway lets you get a safe look at them at close range.



in Alabama and when they made their way back up here, they were going to take Tony back."

Luckily for Ed, Tony and Kesari mated just in time. They produced four white cubs and an orange one. Cincinnati got to keep two white cubs. At last, Ed had the white tigers that he had worked for four years to get!

In turn, these white tigers went on to produce more cubs. Soon the zoo's white tiger collection was one of its biggest attractions. People flocked to see this unusual group of big white cats.

Cat Genes

White tigers are similar to regular orange tigers in every way. The only difference is that their fur is white and their eyes are blue. What produces these differences is their genes. Genes determine the color of hair and eyes in all living animals, including human beings.

For example, a blue-eyed person may marry a brown-eyed person. Their children will usually be brown-eyed. The brown genes are called *dominant*. They take control. Because the blue-eyed genes don't show up, they're called *recessive*. That means they stay hidden.

In tigers, the genes for white fur are recessive. So when a white tiger is bred with a pure orange one, all the little tigers they produce will have orange fur. But these cubs will carry the hidden gene for white fur.

If two orange tigers with this recessive white gene mate, there's one chance in four that their cubs will have white fur. And when an orange tiger with recessive white genes mates with a white tiger, the chances are two in four that the cubs will have white fur.

When two white tigers mate, all their offspring have white fur.

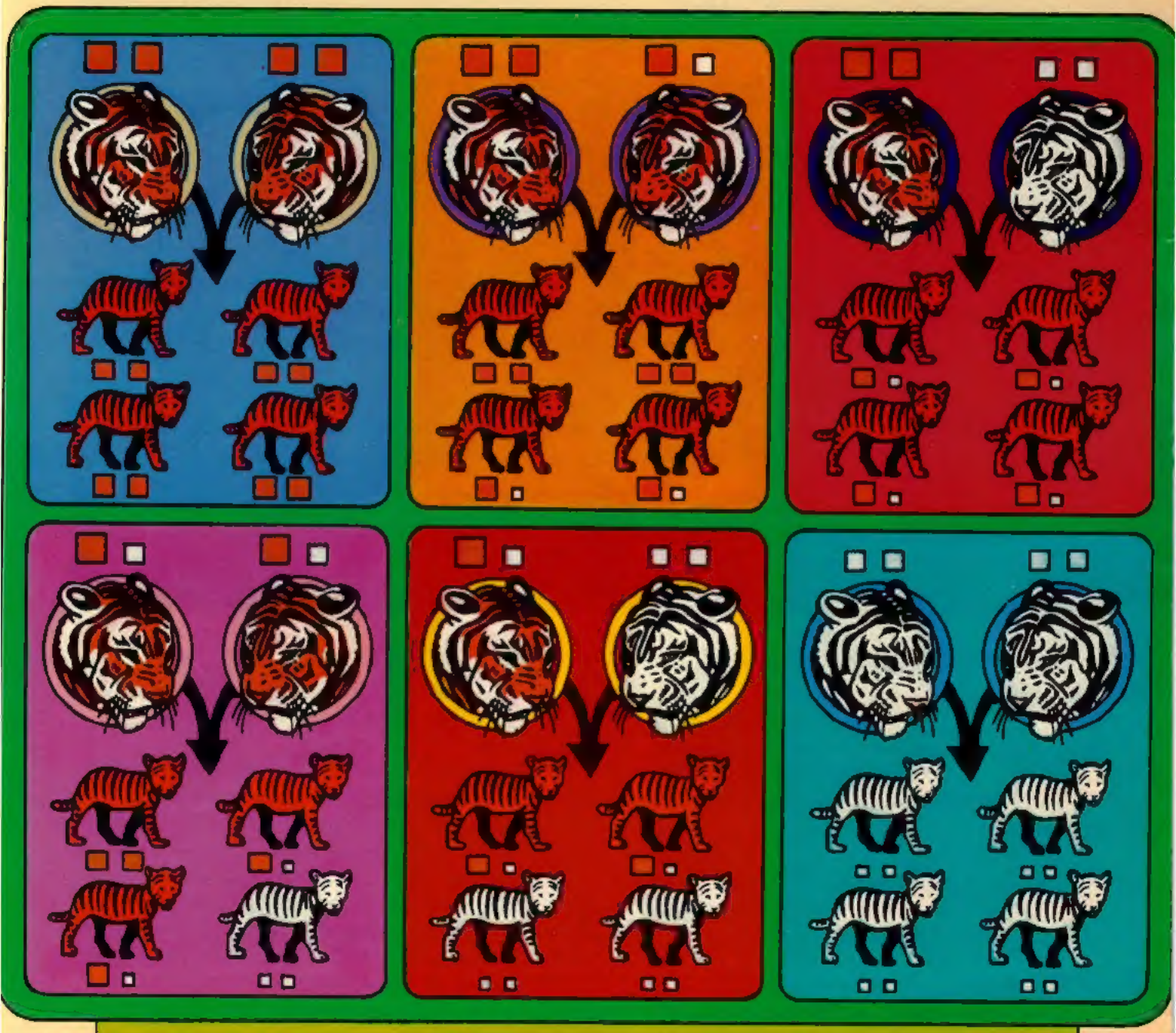
Ed Maruska applied these rules in his tiger breeding plan. He produced a big crop of white tigers for the Cincinnati Zoo. But now he has a different problem. It is called inbreeding.

Ed wants to keep on producing more white tigers. But he can't just mate any two of these white cats ▶▶

together. They are all fairly closely related. And when inbred animals continue to mate with close relatives for several generations, the cubs begin to show serious problems. Some of them will be crosseyed or swaybacked. Others will be sickly or they will die young.

Now Ed has a new breeding program. The goal this time is outbreeding. It is the opposite of inbreeding. Borrowing or buying orange tigers from other zoos, he breeds them with his white cats. The result will be fewer white tiger cubs. But baby tigers produced by outbreeding will more likely be strong and healthy. And some of these orange cubs can later be bred to other white tigers.

Ed hopes his new breeding plan will succeed as well as his first one. If so, the Cincinnati Zoo will continue to be the world's leading white tiger nursery for a long time to come.



Here is how the rules of heredity work when a zoo breeds white tiger cubs. When different sets of tiger parents mate, the chart shows how their cubs would most likely look. ■■ represents an orange tiger. ■□ means an orange tiger which has a recessive gene for whiteness. □□ is a white tiger. Tigers sometimes give birth to more than four cubs, of course. Four cubs are shown here just to provide examples to compare.

The Bloodhound Gang

A Case of Trouble in Paradise

Part Three

by Madeline Sunshine

In our last episode, Vikki, Ricardo and Zack had discovered that a poison, toluene, was being dumped in Paradise Lake. They had also traced the chemical to its source: The Tandom Toy Company. They paid a nighttime visit to the toy company. But an exploration of the hauler's truck had put them too close to the poison for comfort. Now, they were in a tight spot that threatened to leave them all "down in the dumps" for good.

Vikki, Ricardo and Zack kept banging on the door of the truck, trying to get out.

"Forget it!" laughed Hank Krebs, the man who was holding them prisoner. "It's too late now. I thought a nice evening on the lake would scare you away. But you had to be heroes!"

"So you're the one who emptied the boat's gas tank," shouted Zack.

But there was no answer to Zack's accusation. Instead, the three young detectives heard the door on the driver's side of the truck open and slam shut. Then they heard the roar of an engine, and they were off!

"Now what are we going to do?" groaned Ricardo.

"I don't know," said Zack. "Getting ourselves out of a locked truck is not going to be simple."

"We won't have to get *ourselves* out," said Vikki. "Krebs will do that for us. What we need now is a plan to get away from Krebs once we get out."

"You're right," said Zack. "And," he added, "I think I know exactly how to plan the plan we need!"

Zack explained his idea to the others and, within seconds, they had made the preparations to carry it out.

"Here we go," whispered Vikki as the truck came to a halt. "Keep your fingers crossed, everybody!"

Krebs got out of the truck, walked around to the back and opened the doors. "All right, last stop. Everyone out!" he snarled. ➳

The Gang Escapes

"Here we come," said Zack. With that, he, Vikki and Ricardo pushed the drums of toluene, which were now lying on their sides, out the back of the truck. Krebs began to scream as the drums rolled out, knocking him to the ground. Before Krebs could get back on his feet again, the three young detectives scrambled off into the darkness.

"Okay, you little troublemakers!" Krebs shouted when he finally got up. "I know you think you've outsmarted me, but the joke's on you. You'll never find your way out of these woods. And even if you do, I'll be long gone by then. Once I dump this last batch of toluene, I'm getting out of this state!" Saying that, the man got back into the truck and sped away.

"Watch his lights," Zack told the others. "They'll tell us where the highway is."

The Bloodhounds began to follow the trail of light, until it disappeared. Then, with the full moon to guide them, they made their way to the highway.

"Well, which way now?" asked Ricardo.

"There!" said Zack. "Up a few hundred feet... Doesn't that look like a diner?"

"I think you're right," said Vikki. "Let's go!"

They rushed over to the diner, but it was closed and all boarded up.

"So much for that," Zack said.

"Not so fast," said Ricardo. "There's a public phone near that old gas pump. Maybe it works." He ran over to it, pulled a coin out of his pocket and put it into the slot. "We're rescued!" he shouted out. "I've got a dial tone."

Ricardo called Bill Blake at the Paradise Hotel. He described what had happened and, as best he could, where they were.

"I'll contact the police and the EPA," said Blake. "With a little luck, they'll get to the lake in time to nab Krebs. Then I'll drive out and pick you up."

The Race to the Lake

Within 20 minutes, Blake had picked up the Bloodhound Gang and they were headed back to Paradise Lake. As they pulled up, they noticed two police cars right in front of them. Ricardo dashed out of Blake's van.

"That's Krebs!" he shouted, pointing toward the lake. "That's him over there."

At the sound of Ricardo's voice, Krebs began to run. But he tripped on a rock and landed on top of one of the drums of toluene.

"Looks like we got him over a barrel this time," Vikki chuckled, as the police handcuffed Krebs and led him away.

The next morning, after breakfast, Blake and the Bloodhound Gang went down to the EPA office to meet with Inspector Grant. She had promised to tell them more about Krebs and his operation.

"Well, thanks to you, we got a big fish this time," said Inspector Grant. "Krebs is wanted for dumping chemicals in five states."

"He sure gets around," said Bill Blake.

"That's how these people operate," the Inspector explained. "We call them *Midnight Dumpers*. Their pattern is to use either forged I.D.'s to get work from unsuspecting factories or to bribe factory officials into hiring them. Once they're hired, they pick up chemicals which they dump in sewers, lakes, at the side of the road—anywhere that's convenient for them. When people in the area begin to realize what's going on, these midnight dumpers leave as fast as they came."

"Was the night manager of the Tandom Toy Company working with Krebs?" asked Vikki. "We were supposed to meet him last night, but he never showed up."

"No, we checked the toy company after we caught Krebs last night," said Inspector Grant. "The night manager was tied up and locked in an office. It seems he told Krebs about the three of you right before you arrived. Krebs panicked, grabbed the night manager from behind and tied him up. Then he just waited for you to appear."

A Stiff Penalty

"What happens to Krebs now?" Ricardo asked.

"He goes to trial and if he's convicted, he can get up to seven years in jail and a fine of up to $10,000," replied the inspector. "By the way, whatever fine he has to pay should cover the costs of cleaning up your lake, Mr. Blake. And, in a way, you're fortunate the chemical he dumped was toluene. Although it can be very dangerous, it doesn't seem to have lasting effects in human beings and it's relatively easy to get rid of."

"I know," said Blake. "I've already started the clean up process. Why don't we go down to the lake and see how it's coming along?"

The Bloodhound Gang and Bill Blake said goodbye to Inspector Grant. Then they pulled into the hotel van and returned to Paradise Lake. There, a work crew was busily setting up their equipment.

"Hi," Bill said to Gene Stone, the crew foreman. "How's it going?"

"We're just about ready to begin," said Stone.

"What exactly are you doing?" Zack asked.

"Well, the process is called *aeration*," said Mr. Stone. "And the way it works is really quite simple. The hoses we've set up pump the water out of the lake and then spray it back into the air, over the lake. During the aeration, that is the spraying of water into the air, the toluene separates from the water, evaporating into a gas. The gas floats away and the clean water falls back into the lake."

"So, in other words, you're pumping all the water out of the lake and then spraying it back in again," Vikki concluded.

"That's right," said Stone. "And by the time we're finished, the lake will be crystal clear."

As the foreman finished speaking, Vikki noticed a lone figure walking toward the group.

"Hey, look," she said. "It's Joe Barker."

"We sure were wrong about Joe," Ricardo said.

"Well, maybe we can make it up to him. I've got an idea," said Zack. "Mr. Barker," he called, "have you spoken to Bill Blake about the lake yet?"

Joe Barker got flustered. "No, no," he said. "I figured he had enough troubles now. There'll be plenty of time to speak later on."

Tying Up Loose Ends

"Still, there's no time like the present," Vikki chimed in, catching onto Zack's plan. "See Bill, Mr. Barker was thinking of renting part of your lake so he could attract more guests to his hotel. That would bring more tourists to the area, so it would help everybody."

"I'd be willing to pay you a fair fee," said Barker. "And I'd share in the upkeep, too."

"Sounds good to me," said Blake. "Why don't we try it for one season and see how it works?"

Mr. Barker thanked the Bloodhound Gang. Then the two men made arrangements to meet later that day to work out the details.

"Well," Ricardo said, "it looks like the trouble in Paradise is all cleared up now."

"Not quite," Blake replied. "Here comes my ex-chef, Andre."

"Mr. Blake," said Andre. "I've decided not to leave."

"You've what!" Blake exclaimed.

"I will not be fired," Andre replied. "I'm too good a chef!"

"You know," said Blake, "that's true. You are a good chef. Now if only you didn't have such a terrible temper. . . ."

"Terrible temper!" Andre broke in, his voice getting louder as he spoke. "Why, I'll have you know. . . ."

And he and Blake walked back to the hotel arguing every step of the way.

"Well, if Andre's staying, and I'd guess he is, it looks like we're in for a great meal before we leave," Ricardo grinned as the Bloodhounds shook hands on a case well solved. Then they all started back toward their rooms to pack.

As they walked on, a car pulled over to the side of the road.

"Excuse me," called the driver, as he rolled down his window. "We just finished eating and we have a bag full of garbage to get rid of. Do you know if there's a good place to dump it?"

Vikki, Ricardo and Zack began to laugh.

"The trash can near that tree will do just fine," said Vikki. Then she and the others continued on their way.

Next month begins a brand new adventure, starring the Bloodhound Gang.

Factoids

No two giraffes have the exact same pattern of spots.

When a sneeze comes out of you, it can travel at a speed of over 100 miles per hour.

At any given time, snow and ice cover one fifth of the earth's surface.

There are about 380 billion telephones in the world.

When you take a bath, you use about 35 gallons of water.

In 1979, Willie Hollingsworth walked more than 18 miles with a full milk bottle balanced on his head —a record!

An owl's eyes cover one third of its face.

Space Sights

A CONTACT QUIZ

by Rebecca Heyman

You don't have to be an astronaut to get a bird's eye view of outer space. Telescopes mounted on space ships have sent back spectacular pictures of the planets and moons in the solar system.

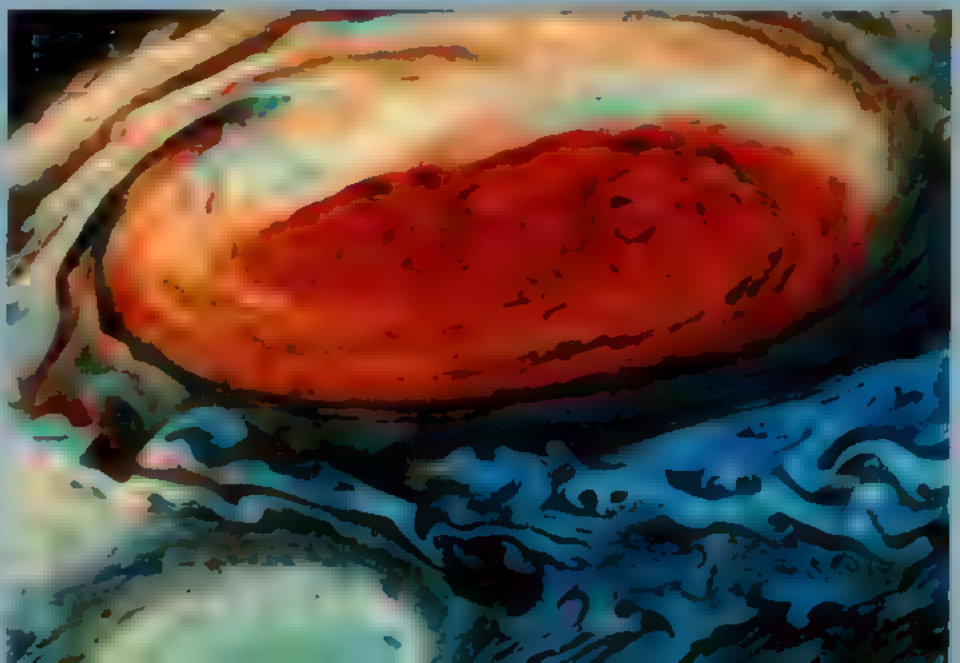
On the next three pages you will find seven photos from space. Take a good look at them. Then see how many out-of-this-world questions you can answer. **Answers on page 37.**

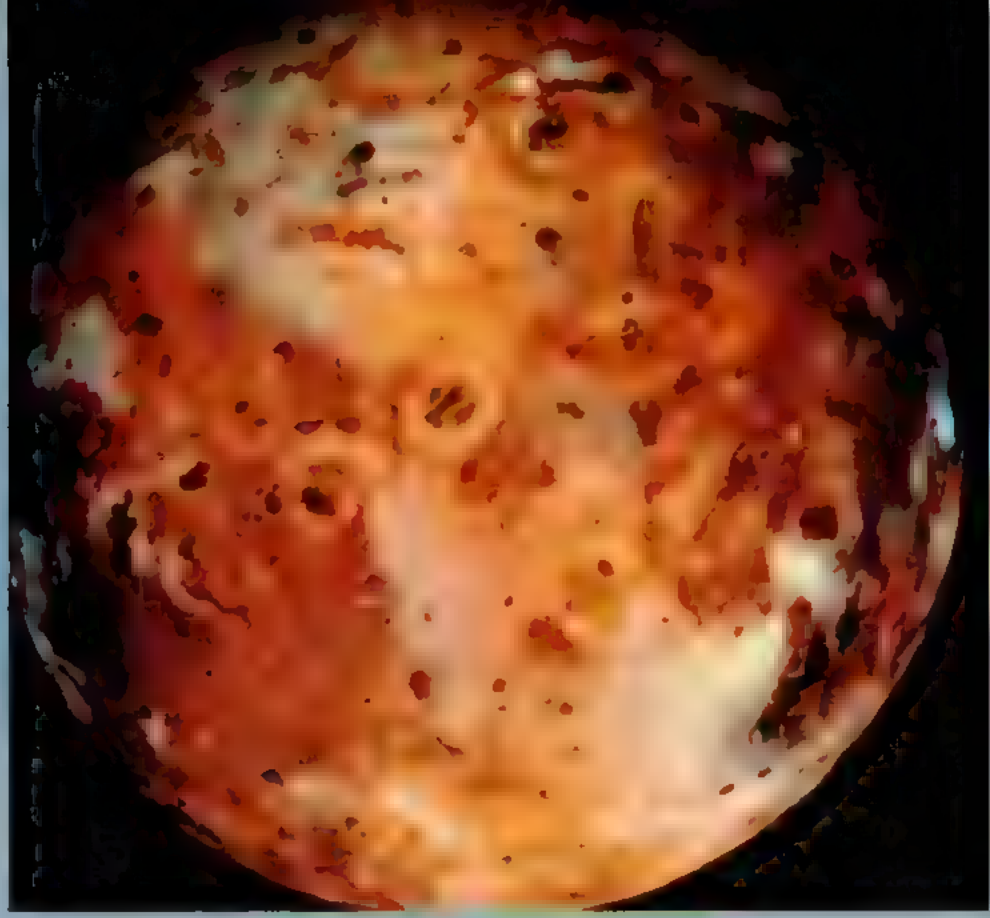
1 The rings of Saturn are made of chunks of ice and frozen rock. Some of the pieces are no bigger than grains of sand. Others are the size of a big house. How many rings are there?

a. One.
b. About 100.
c. Probably thousands. No one knows for sure.
d. Don't ask me. I'm still counting

2 This is a photo of Jupiter, the largest planet in the solar system. That circle you see on its surface is known as the "Great Red Spot." It's actually a giant swirling storm. What size is it?

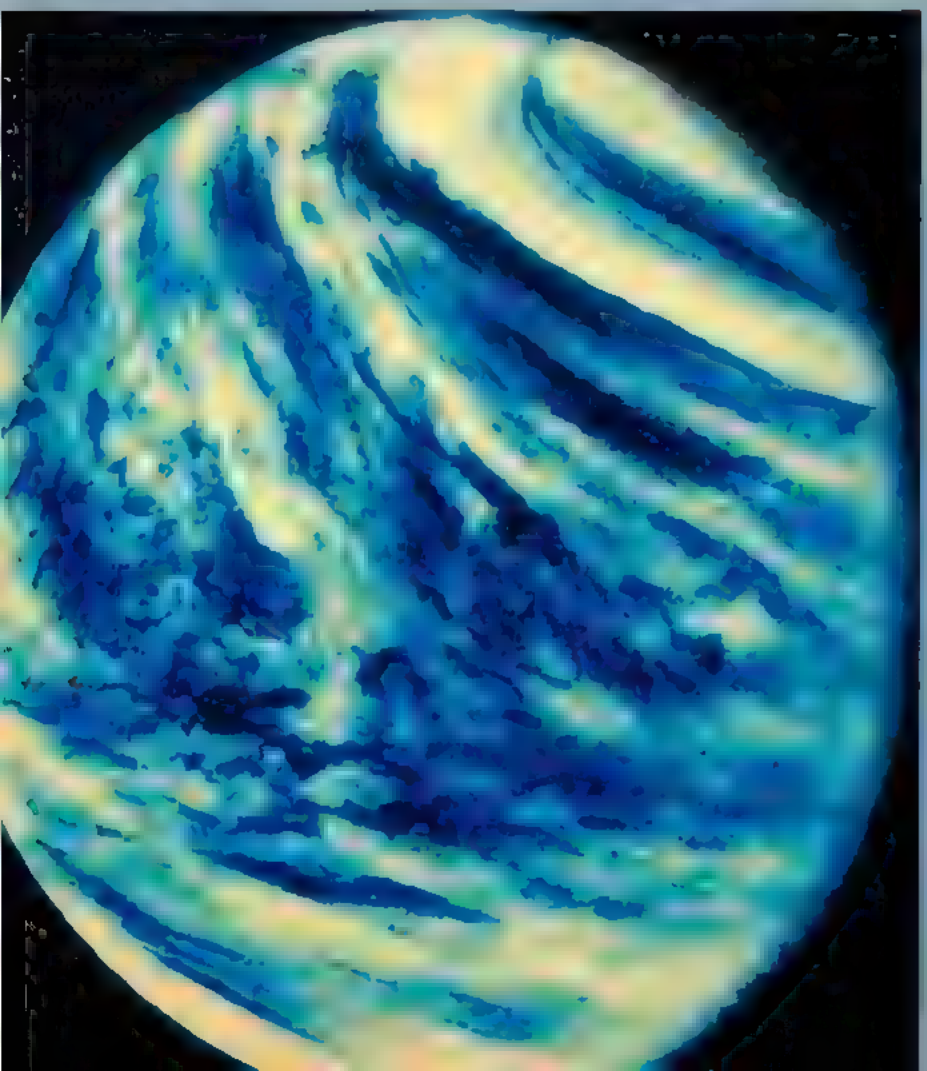
a. The same size as the sun.
b. About as big as two earths.
c. As large as a hurricane.
d. Size 12½ E.





3 This moon can be found orbiting the largest planet. It is believed to have more active volcanoes than any other body in the solar system. What is it?

a. Charon, the moon of Pluto
b. Ganymede, Jupiter's largest moon.
c. Io, Jupiter's second nearest moon.
d. That's no moon. It's the largest pizza in the universe!



4 This is a picture of the planet that is nearest to the earth. The planet is really yellowish brown. But the picture was colored blue so the markings would show more clearly. If you went outside early this evening, you could see this planet. It would appear as a bright light just above the horizon. What is it?

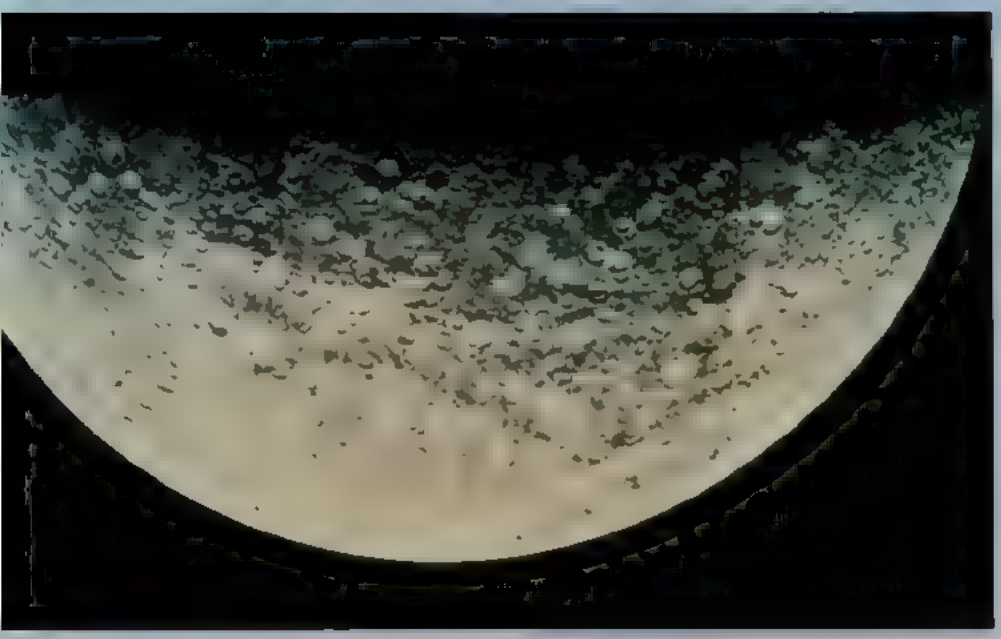
a. Venus.
b. Neptune.
c. The Daily Planet
d. It looks more like a giant marble to me. ➤➤

5 At least 20 more of these orbit the planet Saturn. That circle on its surface is a giant crater that was left when a meteor struck it. What is it?

a. A television satellite.
b. One of Saturn's moons, Mimas.
c. Halley's comet.
d. The Death Star from *Star Wars*.

6 This question is tricky. Take a good look at this space shot. You see this globe a lot, but it rarely looks like this. What is it?

a. Mars, the red planet.
b. The sun at sunset.
c. The moon during a total lunar eclipse.
d. A giant ball of cosmic dust.



7 This may look like our moon, but it's actually a planet. In fact, it is the planet that is nearest the sun. What is it?

a. Pluto.
b. Mercury.
c. Uranus.
d. You can't fool me. I know the moon when I see it!

STAR SEARCH

This constellation was specially made for word hunters. Can you find at least 30 words among these stars?

1. To spell words, travel along the lines from star to star. The letters must connect.

2. You can only use a letter one time in each word.

Answers on page 37.

List of the Month

Meow Mix

by Sandra Markle

The common house cat has some pretty uncommon relatives. Here are a few that fit into that CATegory.

Hunting Cats You know that dogs are trained to hunt, but *cats*? That's right. In parts of Asia and Africa people sometimes train wild cats called caracals (CARE-uh-kuls) to hunt. Training starts when six-month-old kittens are taught to catch small game. Later, adult caracals go hunting on a leash. They're released as soon as game is spotted. Caracals are fast enough to bring down a swift gazelle.

Short End There's one pet cat whose tail you'll never step on. It is the Manx, a cat which has almost no tail. Actually, some Manx cats do have short tails. All you see on these *stumpies* is a very short, stubby bit of fur. But other Manx cats have no tails at all. They're called *rumpies*. Because of the way they are bred, Manx cats have a funny, hopping walk. Some people think they look a little bit like rabbits.

Nine Lives? The ancient Egyptians loved cats. When a pet died, its owners shaved their eyebrows as a sign of mourning. Rich families gave their cats fancy funerals and turned them into mummies. Mice were also mummified, to give the cat food in the afterworld. These cats and mice were often buried in a special cat cemetery. About 100 years ago a cemetery was dug up. About 80,000 cat mummies were found.

Curly Cats The only house cats with curls are the Devon Rex and the Cornish Rex. These cats have hair that's short and tightly curled. Even a Rex's whiskers and eyebrows are wavy. Most cats have fur made of four different kinds of hair. But the Rex cats have only one kind. Strangely enough, if a Devon Rex is mated with a Cornish Rex, the kittens will always be straight-haired.

Name That Cat You can call this wild cat panther, puma, mountain lion or cougar. It has many names because it lives in many different places from Canada all the way down to South America. Although the puma weighs as much as 150 pounds (68 kg), it can't roar. Pumas belong to the same branch of the cat family as your house cat. Like their little cousins, they purr and meow. But the noises they make are a lot louder.

Fast Cats All cats are hunters. But the cheetah has a style all its own. Instead of slowly sneaking up on its prey, the cheetah turns on the speed. And no wonder. This cat is the fastest of all land animals. It can run about 60 miles (85 km) an hour. There's just one catch. The cheetah can only keep its speed over a short distance. So it either catches its dinner quickly or goes away hungry!

Bald Cat If cat hair makes you sneeze, the Sphinx cat is the perfect pet for you. This kitty has practically no hair at all. Its only fur is a little fuzz on its head, chest and very tip of its tail. This furless feline doesn't even have any whiskers!

The Sphinx cat is a result of careful breeding. Owners say they make great pets—but you have to keep them indoors where it's warm.

Loudmouth Lions can purr, meow, growl and hiss. But it's their roar that makes the world take notice. When conditions are right, people can hear their thunderous roar over three miles (4.8 km) away.

Lions are the loudest cats, but they aren't the only big mouths. Tigers, leopards, jaguars and other big cats roar, too. They all have a special band of tissues in their throats, which allows them to make such a racket.

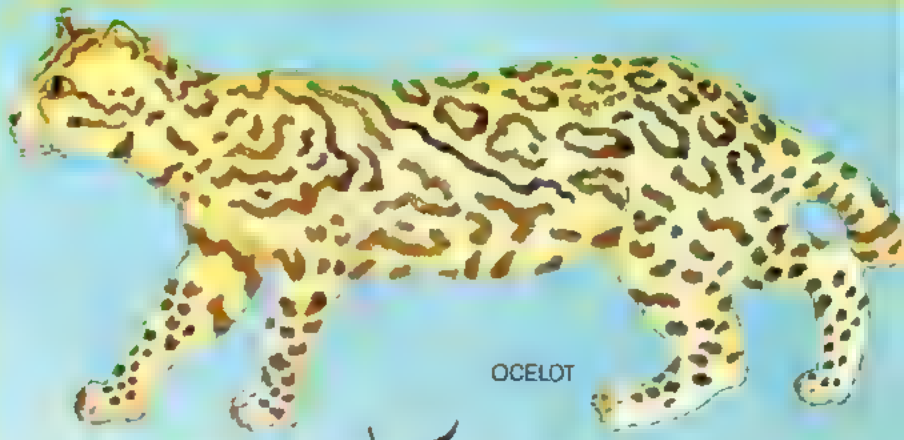
The Cat Family

TIGER

JAGUAR

Big Cats

Lions, tigers, leopards and jaguars belong to the branch of the cat family known as big cats. All the big cats roar loudly.



OCELOT

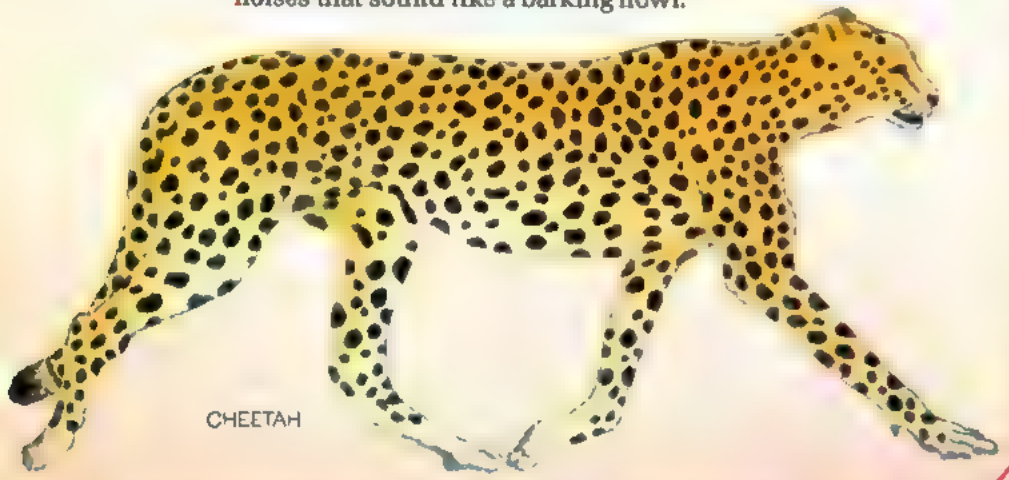
LEOPARD

CARACAL

MOUNTAIN LION

Cheetahs

This swift runner is different from all other cats because it chases down its prey. Cheetahs make noises that sound like a barking howl.



CHEETAH

DOMESTIC CAT

Little Cats

Here are four little cats. There are also 25 other members of the little cat group. Little cats meow and purr.

Extinct Cat

This extinct cat was called pseudalurus (SOOD-uh- LURE-us) It was an ancestor of the big cats, the cheetahs and the little cats.

Contact Report

Jumbo Toothache When Babe got a toothache, it was a mouthful of trouble for everyone.

Babe is an elephant living at the Brookfield Zoo near Chicago. A year ago, she was losing weight. Her keepers were worried. Babe couldn't chew her food well because a back tooth was out of line.

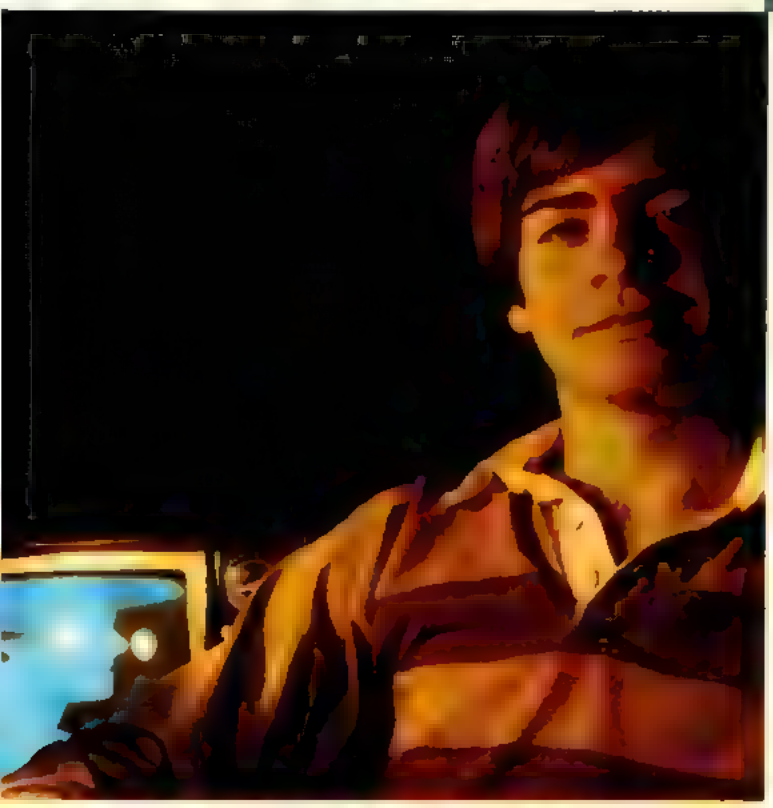
The zoo's veterinarians needed to get the elephant to a dentist. But not just any tooth doctor would do. Babe's molars are eight inches (24 cm) long and weigh seven to nine pounds (3–4 kg).

Dr. David Fagan, a California dentist for animals, was called in. He makes zoo calls all over the country. Dr. Fagan put his big patient to sleep with drugs. Then he checked her tooth and decided to pull it.

Dr. Fagan and a Brookfield vet, Dr. Scott McDonald, had to use a heavy power drill to break up the tooth. And to finally get Babe's tooth out, they needed a crowbar, a hammer and all the help they could get!

—Written by Alijandra Mogilner

Pulling this elephant tooth was hard work.



Frank Uzzolino, 16, built his own TV camera.

What a Ham! When Frank Uzzolino, 16, calls his friends in New Jersey, he doesn't always pick up the phone. Sometimes he turns on a special TV camera with a screen that's hooked up to his ham radio. If his friend has the same equipment, they can see each other while they talk.

The camera is called a low-scan camera. Frank could have bought one. But he built it from scratch instead. He bought some parts at garage sales. Other pieces of equipment were ordered by mail. Frank had to drill about 1,000 holes to get it all connected and working.

Frank's ham radio hobby has come a long way in three years. He first used some simple equipment to tap out Morse code messages to other hams. Then he began talking to them through a microphone.

And now that he has built his own camera, he can send his own picture as well. It took him 18 months to finish the job. But Frank says, "I learned a lot from building it myself." Now he's a happy ham!

—Written by Claire Martin

Contact Report

Have No Fear, Deer When Susan Shaeffer went to college, she took her favorite pet along with her. Sound strange? What's even more unusual is that her pet is a reindeer, named Mindy.

The reason Susan has a pet deer is that she once had an unusual job. Susan used to work as a reindeer herder. She helped take care of large groups of reindeer. These animals provide food and clothing for Eskimos of Alaska.

One of Susan's jobs as a herder was to take care of young reindeer whose mothers died or got lost. Mindy was an orphan that Susan took home and raised as a pet. The little deer drank milk from a bottle and slept on Susan's bed.

Mindy got so comfortable with people, however, that she began to fear other reindeer. So Susan took her to college where there was a herd of reindeer living on the school's farm. While Susan went to classes, Mindy learned how to get along with other reindeer!

—Written by Wendy Williams

Susan's reindeer went to school with her.

Calling All Cars Who uses a phone in a car? Mostly detectives on TV. But soon, new gadgets will make car phones more available.

As you ride along, your parents will be able to call ahead to have a pizza waiting. Their call will travel on a new electronic switching system now being tested by the telephone company. It uses low frequency radio signals to relay your message to other phones.

To make a call, you'll simply push the car's radio buttons like you dial a touch tone phone. To speak, you won't even have to hold a receiver. A powerful microphone in the sun shade will pick up your voice. It even lets the back seat passengers talk at the same time!

—Written by Joanna Foley

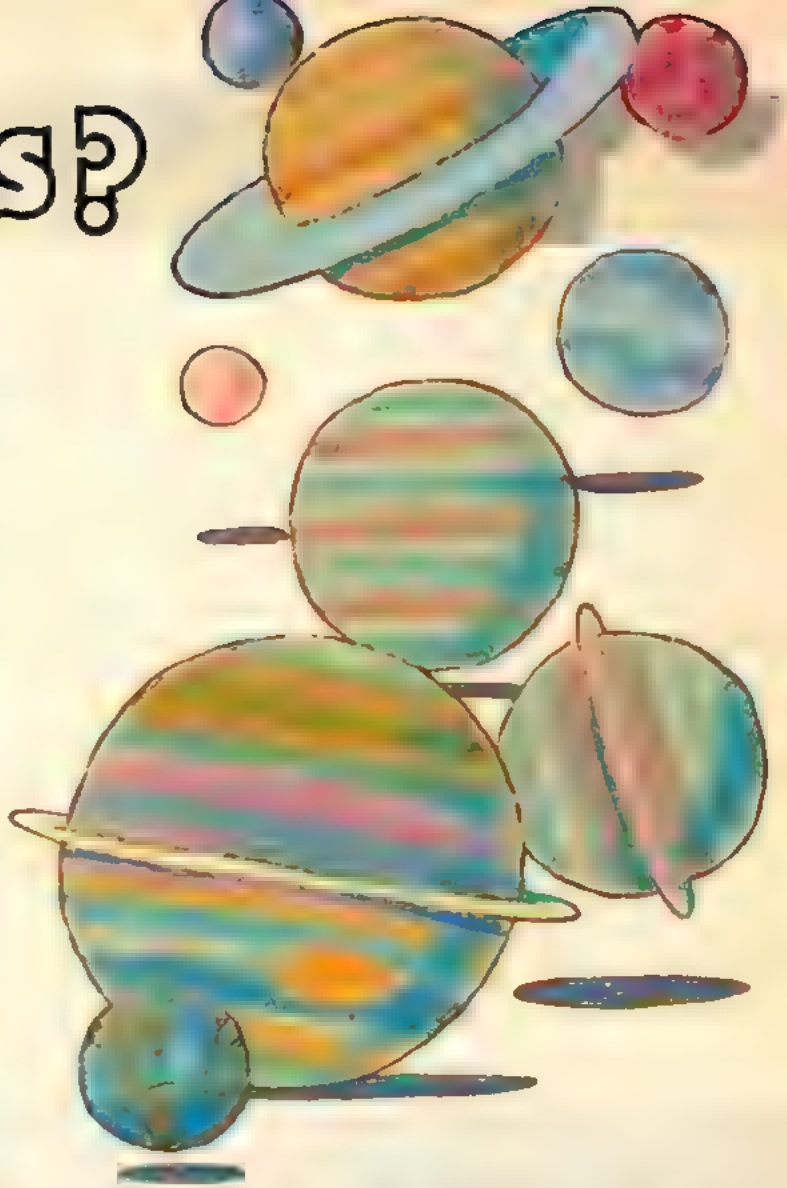
This car from Ford Motors has a new telephone inside.

What's That? Did you read about some kid who invented an electric nosewarmer? Or one who set some new science record? Then cut out the newspaper or magazine story and send it to us. If we use your story, we'll send you a CONTACT T-shirt. Be sure to include your name, age, address and T-shirt size. You must include the name of the newspaper or magazine. Write to:

The Contact Report
P.O. Box 599
Ridgefield, NJ 07657

Any Questions?

by Carole G. Vogel
and Kathryn A. Goldner



Why are the planets different sizes?

There are nine known planets in the solar system. Close to the sun are the *inner planets*. Like the earth, they are small, dense, rocky planets. Farther out in the solar system are the *outer planets*, such as Jupiter. These huge planets are made mostly of frozen gases.

How did things get this way? The answer begins billions of years ago. There were no big or small planets. There wasn't even a sun. The solar system was a huge cloud of gas and dust.

Fortunately, things didn't stay this way. The cloud began to condense. As it shrank, temperature and pressure increased. In the center, where heat and pressure were the greatest, the sun formed. Nearby, the hotter, heavier cloud material clumped together. These lumps formed the inner planets. Much farther away, there were lower temperatures and less pressure. The lighter material collected to form the gaseous giant outer planets

Question sent in by Shannon Brinkerhoff, Downey, CA

Why do skunks stink and other animals don't?

A skunk waddles like someone whose shoes are too tight. It has no large teeth or sharp claws. How can such an animal survive in the wild?

When threatened, a skunk lowers its head and humps its back. Then it stamps its feet and hisses. If that doesn't work, the skunk raises its tail and aims for the enemy's face.

A smelly liquid squirts from two glands near the base of the tail. Whew! Not only does the spray stink, but it can also sting the victim's eyes.

The skunk's close relatives—badgers, minks and weasels—have stink glands, too. But they don't smell nearly as bad as skunks do. They don't have to. They fight their enemies with sharp claws and teeth.

If you should ever have a close encounter of the smelly kind with a skunk, don't worry. The stink will go away in a few days. For faster relief, take a bath in tomato juice or vinegar. The acid in them will do the trick.

Question sent in by Melissa Robinson, Goddard, KS.

Do you have a question that no one seems able to answer? Why not ask us? Send your question, along with your name, address, and age, to:

Any Questions?
3-2-1 CONTACT
P.O. Box 599
Ridgefield, NJ 07657

Why do ice cubes look so white in the center?

To understand what goes on in an ice cube, think of a glass of water. If you let the water stand long enough, you will notice little bubbles forming on the glass. The same thing happens when water starts turning into ice.

Since ice cubes first get cold at the edges, the water freezes from the outside in. As the water sits there in your freezer, some of the gas escapes. The rest gets trapped in the center of the cube. There, air bubbles form. Light, which strikes the borders of the air bubbles and the ice around them, scatters, or breaks up. It makes the bubbles look white.

But that's only part of the answer. When water freezes, it expands. As the inside of the cube freezes, it presses out on the ice that surrounds it. That makes the ice crack just a very little bit. Light scatters along the cracks, too. Together, the cracks and the bubbles give an ice cube its white center.

Question sent in by Chat Whitwam, Walnut Creek, CA.

Why does Swiss cheese have holes?

Here's the hole—er, whole—truth. Most cheeses are made the same basic way. Bacteria are added to warm milk. Later, something called an enzyme (EN-zime) is added. It makes the milk split into liquid and solid parts. The solids are chopped up, salted, pressed and placed in a temperature-controlled room. Then the bacteria get to work. They change the solids into cheese

For each cheese, the steps in the process are a little bit different. When Swiss cheese is made, it is placed under air pressure that is heavier than usual. Meanwhile, the bacteria in the soon to be Swiss cheese have been producing gas. The gas forms bubbles that are trapped in the cheese. These bubbles make the holes in the cheese. Under the heavy air pressure, the holes can grow to be as much as one inch (2.5 cm) wide. After a few months of careful aging, you have Swiss cheese, complete with holes!

Question sent in by Shanna Liptzin, Lexington, MA.

ICE CAMPING

An Arctic Adventure

by Kim Solworth Merlino

People from the United States, Norway, Denmark and Canada set up camp together.

What would you do if you woke up one morning to find that your front yard had floated away? Another step and you would end up swimming in freezing cold water. Sound impossible? Not if you happen to be living on top of the Arctic Ocean.

Shifting chunks of ice under your feet is just one of the problems you would have to face in the Arctic. Every day you would wake up to temperatures of −40°F (−40°C). Your only neighbors would be polar bears who came to see what you were doing there. No wonder the Arctic is one of the least explored places in the world!

But certain people spend part of every winter camping out there on top of the Arctic Ocean. One of them is Tom Manley. Tom is an oceanographer, a scientist who studies the oceans. For Tom and other scientists who go with him, the Arctic is a place of very special interest. They travel there to study the ocean and the climate.

Though this area is awfully far away, much of the world's weather is influenced by the ice that covers the area around the North Pole. If this ice ever melted completely, the world's oceans would be flooded with too much water. On the other hand, if the ice cap doesn't melt enough, it could be the sign that another ice age is on the way. By conducting experiments there, Tom checks up on possible shifts in the world's weather patterns. If any major changes are coming in the near future, Tom will know before they happen.

An Icy Landing

The Arctic is one of the coldest places on earth. So why do Tom and other scientists have to go there in the middle of winter? Unfortunately for them, that's the only time when the ice where they will camp is nice and thick. Winter is also the only season when a plane can land on the ice.

An Air Force plane carries Tom and about 20 other people to their campsite. Some of them come from Canada, Denmark and Norway. Because these countries border the Arctic, scientists there are

eager to learn more about weather in the frozen north. Other members of the expedition won't work directly on science experiments. Instead, they will aid the scientists by cooking food and helping to operate their equipment.

The Air Force pilot has to guess where the ice is thick enough to land. The plane is very heavy. All the supplies the explorers will need for the six weeks' stay must be brought in with them. When they finish unloading, the plane returns to Greenland.

Tom and his fellow explorers get to work as soon as they land. Using wood, nails and tools, they build floors for their homes. On top of the floors, they put up metal and cloth huts. The huts look like large orange tents.

"Inside, we have heaters," says Tom. "The top of the hut is as warm as the inside of your house. But if you spill water on the floor, it would freeze."

Tom's hut is slightly different. He builds it so he can use his scientific equipment without having to go outside in the cold. His job is to learn as much as possible about the Arctic ocean water. So first he cuts a big hole in the ice. The others have to help him chop through the thick ice with a chain saw and axes. The ice goes down nearly 10 feet (3 m). Even with help, it takes a whole day to get to the ➤➤

The scientists use a helicopter to help them do their work. It lifts heavy crates.

As the crew builds huts, a snowmobile pulls a giant heater around camp. It warms the air so people can take off their mittens to work without freezing their hands.

water down below.

Then Tom builds a wooden floor for his hut that fits over this deep hole. He cuts a hole in the floor so his equipment can be raised and lowered to the water. Finally, his hut is built over this floor.

Tom's most important equipment is a heavy steel cylinder about the size of a large fire extinguisher. When he lowers it into the water on a long cable, it measures the temperature of the ocean. It also measures the water's saltiness and its depth. The machine sends all that information up the cable to a computer in Tom's hut. The computer records everything that Tom's machine finds out about the ocean.

Cold Camping

Camping on ocean ice is dangerous. But there's no place else to live in the Arctic. The scientists built their camp on a *floe*, or chunk of ice, about two miles by four miles (3 x 5 km). But between this thick ice and other nearby floating chunks is very thin ice. When the ice is thinnest, it can separate. It actually breaks up sometimes. Then half the camp can float away.

Constant cold weather is the biggest problem Tom faces in the Arctic. To survive, he and the others wear special clothing. They start with long underwear and warm wool shirts. Next are thick windproof overalls, topped with a big, down-filled parka. The explorers wear felt-lined boots called *mukluks*. Their hands are protected from cold air and snow by puffy cold weather mittens that reach up to their elbows.

After wrapping up in thick clothing all day, the scientists have to peel off all these layers to take a shower. The only place in camp that is warm enough is the generator hut. The generator burns fuel to make electricity for the camp. A shower in the hut starts with a person filling a big barrel with ice from out of doors. Then an electric heater is used to melt the ice and warm the water. "But the only problem is that the generator is so noisy that it hurts our ears," says Tom. "So we wear earmuffs while we take a shower."

Left: Danger! The Arctic ice once cracked in the middle of camp. The chow hut almost floated away.

The extreme cold also makes Tom and the others eat more than they do at home. Their bodies need extra energy to keep warm. By eight o'clock in the morning, everyone goes to the chow hut for an all-you-can-eat breakfast. The scientists feast on eggs, pancakes, bacon, toast and hot drinks.

Then they work through a cold day while looking forward to a great dinner. Tom smiles when he remembers his favorite Arctic meals. "We'd have steaks, roast beef, lobster or shrimp," he says.

The cook brings a stove to the camp. But there is no need for a refrigerator here. All the meat is kept frozen by piling it outside the chow hut door.

Back to Civilization

As spring comes to the Arctic, it is time for Tom and the scientists to go home. They have learned as much as they can for now. They pack their equipment and take down the huts. The big Air Force plane comes to pick them up.

When Tom returns to his laboratory, he will write a report about what he has learned. Of course, he knows that there is still much more to be discovered about the Arctic Ocean. So he and some of the others plan to return next winter—to camp out again on another floating chunk of ice!

Above: When the explorers get low on food, a plane drops new supplies by parachute.
Left: Meal time is everyone's favorite time of day. Cold weather and hard work make the explorers very hungry.

Timeline

An early telescope helped Galileo make new discoveries.

The History of Telescopes

by Fran Garvan

Past

For thousands of years, people gazed at the skies with wonder. Why did the stars twinkle? Was the earth the center of the universe? People wanted to know.

The telescope would one day provide the answers. It was discovered accidentally in 1608 by a Dutch lens maker. One day, Hans Lipperskey held one lens in front of another. He noticed something unusual. When he looked through them, the church tower across the city seemed to be much closer. Using this idea, Lipperskey built the first telescope. It quickly became popular with sea captains and explorers.

One year later, Italian inventor Galileo realized that the telescope could be used in his own scientific work. So he built one of his own. Once again it had two lenses. The first was used to focus the image of something far away. The second then made this image larger. Galileo pointed his telescope to the sky. With it, he saw things that no one had ever seen, including the craters on the moon and the moons of Jupiter. He used his telescope to prove many of his theories about the universe.

The early telescopes were like huge magnifying glasses. They had long tubes and huge pieces of glass. They were clumsy and hard to use. But they revealed wonders that had never been seen before. And as people built better telescopes, they learned more and more.

People still have many questions about the universe. Is there a tenth undiscovered planet in our solar system? How do galaxies form? Is there intelligent life on some distant world? Once again, scientists are aiming their telescopes into the sky and searching for answers.

Today's most powerful telescopes look very different from the one that Galileo built. For one thing, they are a lot bigger. The largest telescopes are called *reflectors*. They use huge curved mirrors, instead of lenses, to focus a distant picture. The largest one in the United States is locate 1 in a building on top of Mt. Palomar in California.

Mt. Palomar's reflector uses a giant curved mirror that measures nearly 17 feet (5 m) across. It can see into space about a million times better than the human eye. Instead of looking through an eyepiece, this huge scope is aimed and focused using a computer. The image that the telescope sees is then shown on a video screen, where it can be photographed and carefully studied.

The next step may be to build an orbiting telescope space station. The earth's atmosphere blocks some of the light from the stars. A telescope in space could see about 10 times farther than the largest ones on this planet. With it, some of the clues already seen by huge earth telescopes could be studied to solve more of the mysteries of the universe.

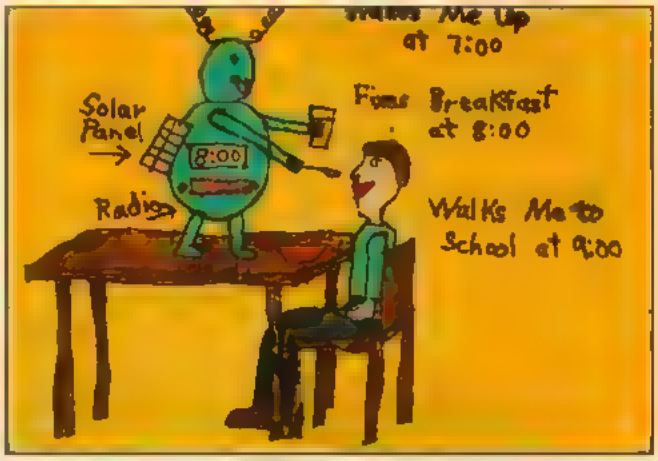
Timeline

Telescopes in space will help people see farther than ever.

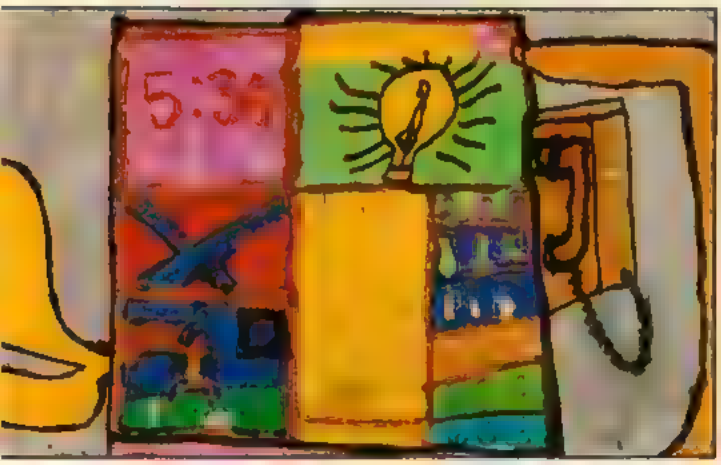
MAIL

Future Clocks Thanks for sending in your future clocks. They were great. Here are our favorites.

Richard Rose, Winnipeg, Manitoba, Canada. This clock of the future gets its power from lightning.

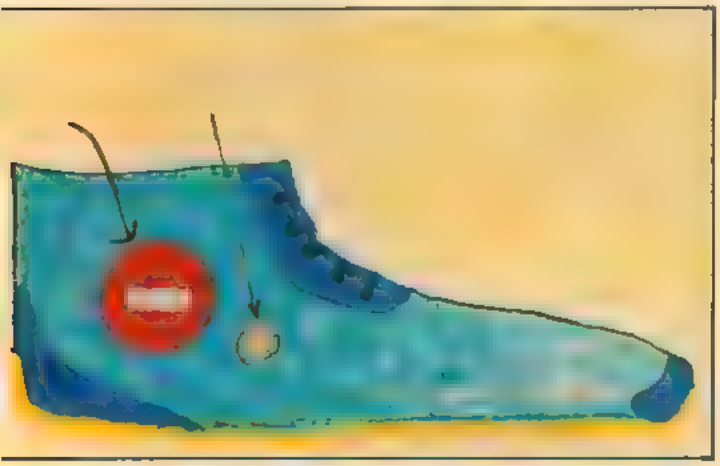


Mark Perrine, Nezperce, ID. The robot clock keeps track of your schedule.

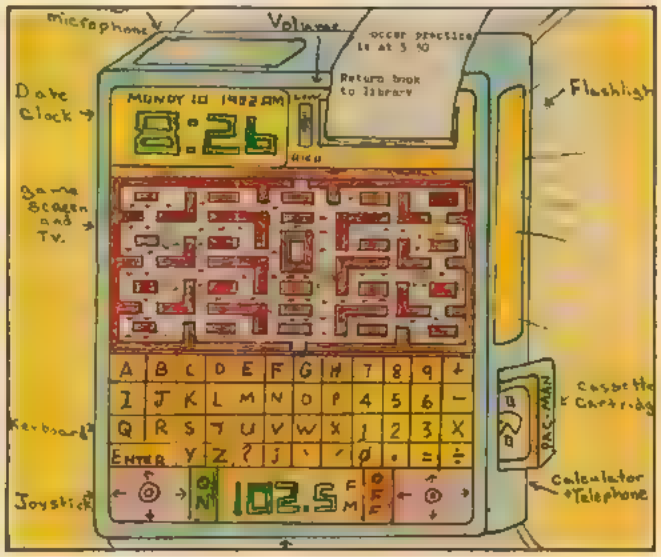


Angie Miller, Pennington Gap, VA. You can watch TV, listen to the news and do math with this future clock.

Hieu Dinh, Bethlehem, PA. When you want to know the time, just look up at your glasses



Amy Jorgenson, Silver Bay, MN. Press a button on your belt and the shoe tells you the time

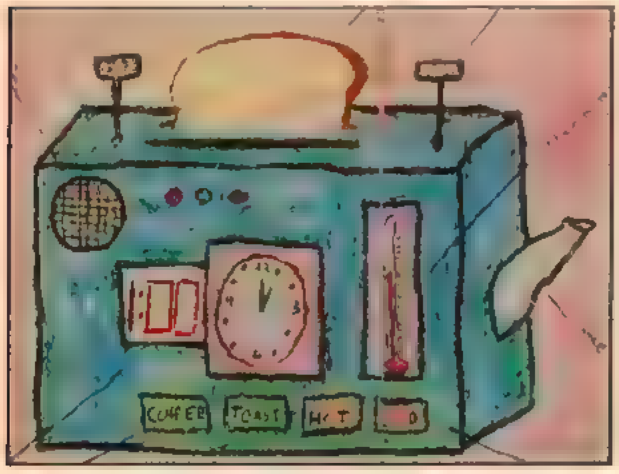


Peter Marquez, Gilroy, CA. How about a clock that plays video games and types memos?

Contest Winners Remember when we asked you to tell us the whole truth or a tall tale about how a town got its name? Here are our favorites.

Whole Truth

A long time ago, in the mountains near my house, there was a great volcanic eruption. Over the years, the volcanic ash formed elevated pieces of land called mesas. The rock from the ash is a very white color White Rock got its name from the white rocks.
Rob Bentley, White Rock, NM



Ricky Gutierrez, North Lauderdale, FL. Have your breakfast with this solar-powered clock.

Gary Oltmann, Giddings, TX. This clock is also a bracelet with a radio, TV and phone.

Fountain Hills is mostly desert. It had once been a ranch. The town is 11 years old and has a view of hills and mountains And in the center of the lake is a fountain which shoots water 560 feet (170 m) high Fountain Hills . . . one fountain, lots of hills.
Lisa Walker, Fountain Hills, AZ

Tall Tales

Long ago, a group of settlers were meeting to decide a name for their new town. John and Sarah Smith were at the meeting. Everyone was thirsty and talking very loud. John asked who wanted a glass of soda. He turned to his wife and asked, "Soda, Sarah?" She didn't hear him above the noisy crowd. So he shouted "Sarah, soda?" The people stopped everything and someone said, "That's a great idea. We'll name our town Sarasota. And they did.
Maureen Sullivan, Brandon, FL

How Fortuna got its name: Two men were fishing west of town one day. One man asked the other, "Are you fishing for perch?" The other man said, "No, I'm fishing for tuna."
Thomas Mosser, Fortuna, ND

Timeline

Send Us Your Future Telescopes

What do you think the telescopes of the future will be like? Will they let you see the stars during the day? Perhaps they'll be powerful enough to find creatures on other worlds.

The choice is yours. Send us your drawing for the telescope of the future. Tell us what it does. Don't forget to write your name, address and T-shirt size on the drawing. Our favorites will get CONTACT T-shirts. Write to:

Timeline: Telescopes
P.O. Box 599
Ridgefield, NJ 07657

Reviews

Want more information on some of the things in this CONTACT? Or just some things to do and see for fun? Keep reading!

Powers of Attraction

You know magnets will attract many metal objects. But how will they do when they are acting through other things? Take the paper clip and magnet you used in this month's Experiment and see for youself.

First put the clip in a glass. Does the magnet attract the clip through it? Will it attract the clip through a dish of water? How about a metal can (not aluminum)? A plastic cup? Cardboard?

You will find that none of these things can stop the magnet's powers of attraction—except the can. Because the can is made of a magnetic metal—probably steel—the magnetic attraction is diverted into the can. So it does not pass through to the clip.

Kitty Literature

If you have a pet cat, you might be interested in "Caring for Your Cat," a pamphlet put out by the Humane Society of the United States. It has information on feeding and caring for your kitty. This one isn't a freebie, though. If you want a copy, you will have to send 30¢ plus a stamped self-addressed envelope to: **Publicity Dep't: KIND, The Humane Society of the U.S., 2100 L Street, NW, Washington, D.C. 20037**

Polar Books

In this issue you found out how people survive at the North Pole. But what about the other end of the world? Here are some books you might want to explore.

Antarctica: Exploring the Frozen Continent Robert Scott wanted to be the first man to reach the South Pole. So in 1901 he sailed to Antarctica and began his journey. Scott reached the pole in 1902, but never lived to tell of it. He died of cold and hunger on the way back. In this book by Maggie Scarf you'll read the exciting stories of Scott and other South Pole explorers. It's published by Random House.

The First Book of the Antarctic Antarctica is a land of endless ice, howling blizzards and freezing temperatures. Still, people live there for months at a time studying the earth. In this book, published by Franklin Watts, Joseph Icenhower tells you how people live and work in this desolate environment.

South Pole Station In this book by Melvin Berger you'll visit Amundsen-Scott station—the scientific laboratory at the South Pole. You'll find out how people are picked to work there and how they are trained to live in the Antarctic. There are also lots of interesting pictures of the places where people eat, sleep and work at the South Pole station. The book is published by John Day Company.

Previews

Weather Watch

This is the time of year for snow and cold rain. Weather forecasters can tell you just how much of the stuff has fallen. But you can find out yourself by making a snow or rain gauge. You need a glass jar that is as wide on top as it is on the bottom. You also need masking tape, a ruler and a pen. Here's what to do.

1. Put a strip of tape straight up and down along one side of the jar. Using your ruler, mark off inches and half inches from bottom to top of the tape.

2. Put the gauge outside away from trees and buildings. Put rocks around it to keep it from tipping.

3. After it rains or snows, see how many inches of the stuff is in your gauge. Compare your results to the weather report.

3-2-1 Contest

Powerful orbiting telescopes, like the one you read about in *Timeline* will make it possible to see space more clearly.

Imagine you are a scientist looking through one of these telescopes. You point it into space and take a peek. You can hardly believe your eyes!

What did you see? That's up to you. Draw a picture of the surprising sight you see through this super telescope and send it to us. Our favorites will win T-shirts. Send your drawing, name, address and T-shirt size to:

3-2-1 Contest: Super Sky Sight
P.O. Box 599
Ridgefield, NJ 07657

Hot Springs Museum

This review was sent in by Hardin Gave Engelhardt, Cheshire, Connecticut.

At the Mid-America Museum in Hot Springs, Arkansas, I could touch and experiment, not just look. I experimented with water, gravity, erosion, weight, colors, light, sand, lasers, ice, wind and mirrors. I felt that I was rediscovering the answers to the world's mysteries. People of all ages were there and enjoying it. Science was fun! The experiments were fun. I'll go there again!

Been to a museum lately? Why not write a review of 100 words or less for CONTACT? If we use yours, you'll get a T-shirt. Send your name, address and T-shirt size to:

3-2-1 CONTACT
Museum Review
P.O. Box 599
Ridgefield, NJ 07657

Experiment

Make a Compass

Compass needles always point north. What they are pointing to is the north magnetic pole. You can read about that in *Earth Works*. Better yet, why not make a compass and see for yourself.

What You Need

a glass jar
a bobby pin
a magnet
a paper clip
a pencil
thread
scissors
fingernail polish

What You Do

1. Spread the bobby pin apart. If it has plastic tips, trim them with scissors.

2. Hold the bobby pin by the crooked part in the center and stroke it with your magnet 100 times. Always stroke in the same direction and lift the magnet after each stroke.

3. Test the bobby pin by seeing if it will pick up a paper clip. If it won't, stroke it some more.

4. Tie one end of the thread to the center of the magnetized bobby pin. Tie the other end of the thread to the pencil.

5. Place the pencil on top of the jar so string and bobby pin hang down in the center. They should not touch the jar.

6. Set your compass up outside, far from magnets or metal objects. When the bobby pin stops spinning, mark the end that points north with a dab of fingernail polish. Ask someone where north is, if you don't already know.

Why It Works

The earth is like a magnet. Just like any other magnet, it has a north magnetic pole and a south magnetic pole. Invisible lines of force, the earth's *magnetic field*, stretch from one pole to the other.

When you stroked your bobby pin with the magnet, you made small particles inside the bobby pin line up in a certain way. So the bobby pin became a magnet, too.

When the magnetized bobby pin was hung from the pencil, it could turn freely. That made it line up with one end pointing north—to the north magnetic pole of the earth. And that's why a real compass needle points north, too.

Did It!

Quiz (page 14)

1. C	3. C	5. B	7. B
2. B	4. A	6. C	

Star Search (page 17)

We found 50 words.

ACE	GO	NEON	PAT	SPAT
APT	GONE	NET	PATE	TALC
AT	IS	NEW	SIT	TAP
ATE	IT	NOW	SITE	TEA
CAP	KIT	ON	SLAP	TEAL
CAPS	KITE	ONE	SLATE	TEN
CAT	LACE	PA	SNOW	TIE
CLAP	LAP	PACE	SNOWY	WET
EAT	LATE	PAL	SPA	WOE
EON	NEAT	PALS	SPACE	WON

We Want Mail! That's right. We want you to write to CONTACT. Do you have a question about our magazine or show? Or maybe you have a science story, an idea or a picture you'd like to send us. Perhaps we'll print your letter.

Write to:
3-2-1 CONTACT Letters
P.O. Box 599
Ridgefield, NJ 07657

Thank You! Special thanks to student intern Nancy Arnott for help with this month's issue.

Next Month!

Here's a sample of what you'll find in the next issue of 3-2-1 CONTACT:

Go Fly a Kite!

Find out what, besides fun, people use kites for. See how to make one of your own.

Animal House

Meet a woman who cares for sick and homeless animals.

Bloodhound Gang

The start of a brand new adventure starring Vikki, Ricardo and Zack.

Plus Factoids, a Poster, Mail and Much More!

Credits

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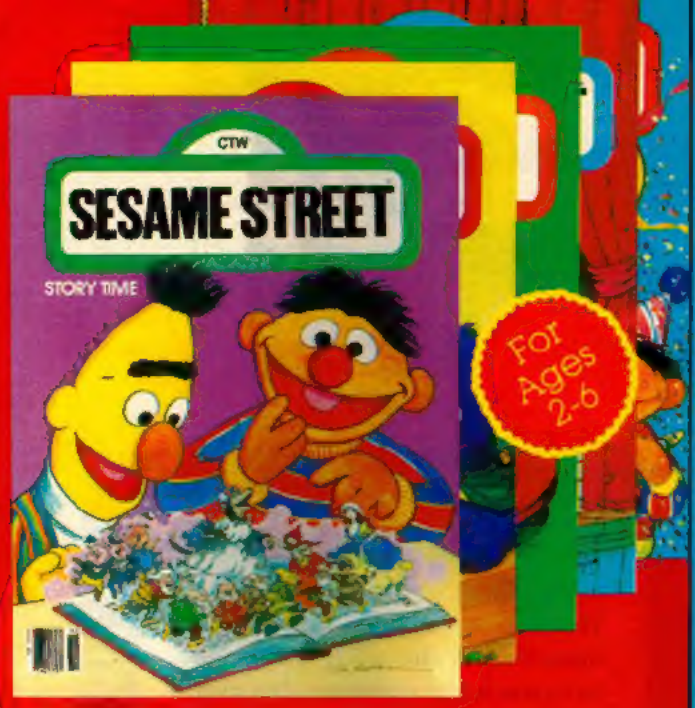

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Earthfacts: The North Pole

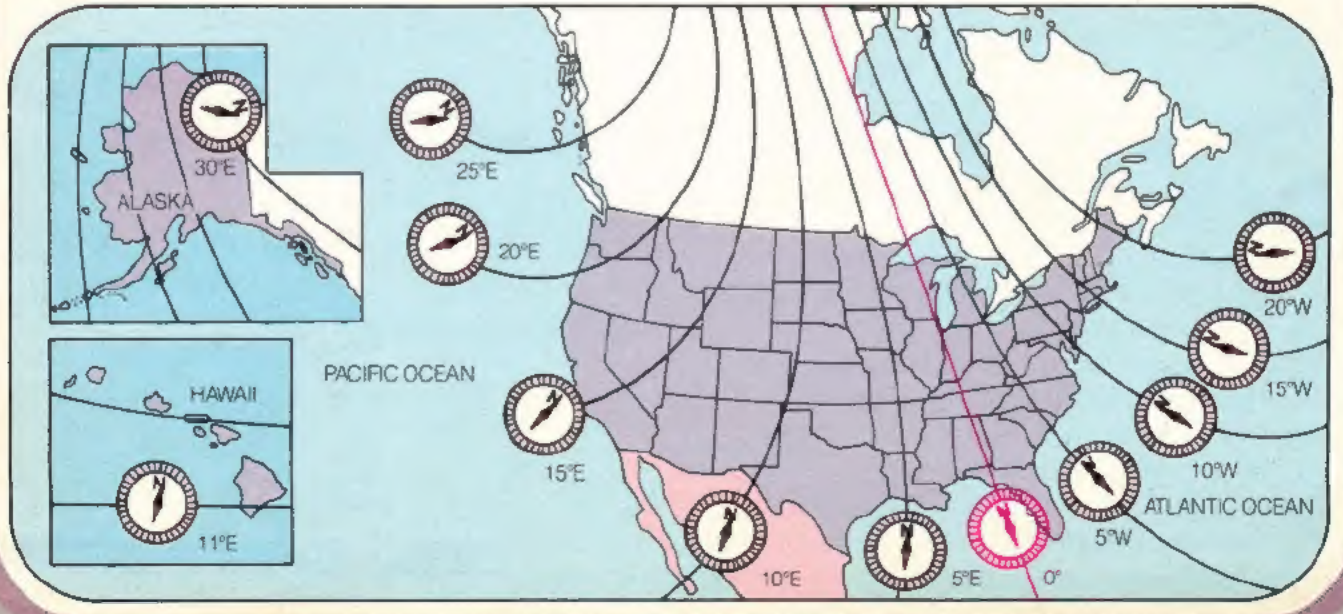
by Carol Costello

Each month CONTACT will bring you another *Earth Works*. Save these pages in a notebook. Soon you will have your own guide to the wonders of the planet Earth.

EarthWorks

- There are two North Poles. The place that is at the tip top of the world is the *geographic North Pole*. The other North Pole is a few hundred miles away in northern Canada. It is the *magnetic North Pole*. When your compass needle points north, it is pointing to the magnetic North Pole.
- The geographic North Pole is always at the same spot. But the magnetic North Pole shifts. For the past few years, it has been moving north through Canada. No one knows why it moves.
- Because the location of the magnetic North Pole is always shifting, new maps are made every five years showing where it is.
- The North Pole region is very cold. The average temperature there is −30°F (−34°C).
- The North Pole is always cold because of the tilt of the earth. Sun always hits it at more of an angle than anywhere else, so sunlight is weaker. In addition, snow and ice reflect lots of sun and prevent heat from building up.
- Because of the tilt of the earth, the sun rises once each year at the North Pole, in March. It stays up for six whole months until September. Then it sets and there are six months of darkness until it rises in March again.
- In April 1909 Robert Peary and Matthew Henson became the first people known to have reached the geographic North Pole.
- There's no pole at the geographic North Pole. So, explorers use special instruments like the *sextant* or *transit* to tell they are there. These instruments tell how high the sun or a star is above the horizon. If the measurement is a certain number, they know they've reached the pole.
- Ice in the Arctic Ocean makes it impossible to travel over the North Pole in a ship. But in 1958, a submarine called the *Nautilus* crossed the pole beneath the ice. In 1959, another submarine called the *Skate* came up through the ice at the North Pole. The crew saw lots of snow—and a very surprised polar bear!

Below: In most places, compasses don't point true north to the geographic pole. They point to the magnetic pole. Compasses point true north only along the red line. East of it they point left of true north. West of it they point right of true north. The compasses here show the amount of deviation where you live.



EarthWorks

The North Pole

These people are standing right in the middle of an ocean. Lucky for them, they're at the North Pole where the Arctic Ocean is frozen.

No one lives at the North Pole because it is so cold and barren. But that hasn't stopped adventurous people like these from going there. Many polar explorers of the past have vanished in the frozen wilderness. But others have succeeded, going by foot, sled, plane, submarine—even snowmobile!

For more on the North Pole, turn to page 39.

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